

STRING CALCULATION

String #	No of Modules	Estimated Power	I _{max}	V _{oc}	V _{mpp}	V _{rise} (<= 2%)
1	12	4,920 W	18.15 AC	<30	240V AC	1.47+0.38 = 0.85
2	11	4,510 W	16.63 AC	<30	240V AC	1.35+0.35 = 1.70
3	11	4,510 W	16.63 AC	<30	240V AC	1.37+0.37 = 1.74
4	11	4,510 W	16.63 AC	<30	240V AC	1.30+0.34 = 1.64

NEC Code (2020) and UL Standard References

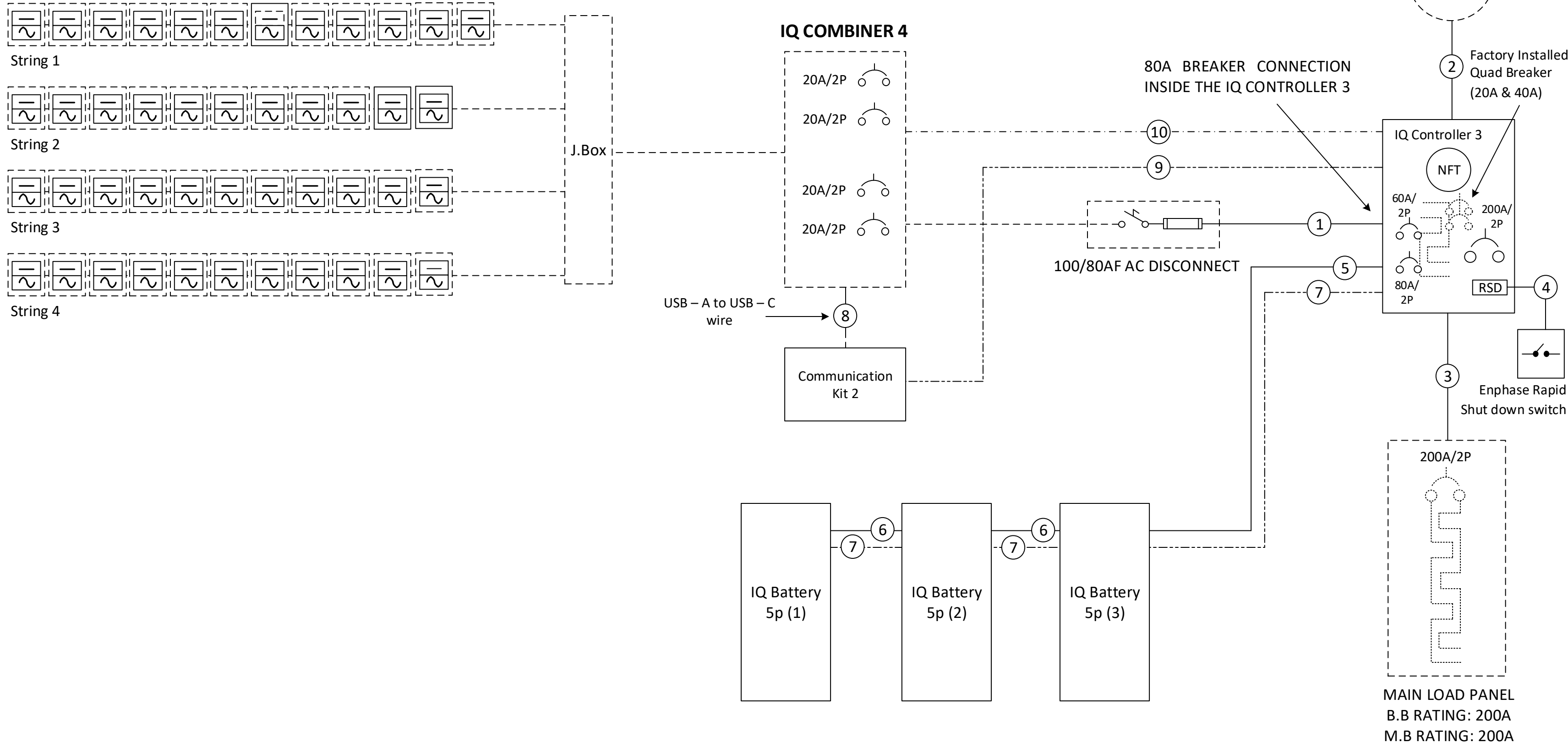
Rapid Shut Down	NEC 690.12 (A-D), UL1741	Grounding	NEC Article 250.30(A)
Disconnecting Means	NEC 690.13	Conduit Fill	NEC Table C.9, 310.15(B)(3)(a)
Feeder Sizing	NEC Table 310, 15(B)(16, 17)	Interconnection	NEC 705.12
Over current Protection	NEC 690.9		



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45 X SILFAB ELITE SIL-410 BG
410W
ENPHASE IQ8PLUS-72-2-US MICROINVERTERS
290VA
RAPID SHUTDOWN EQUIPPED

Service Side Work: Power Drop Required



Customer Information:

Gerald Rhodes
2923 Highway 87 N
Sanford NC 27332

Customer Signature:

Sheet Name:

Electrical One Line Diagram

JOB NUMBER:

24-66-GR

Date:

03/21/2024

Revision:

A

Sheet Size:

ANSI C
17" X 22"

Sheet Number:

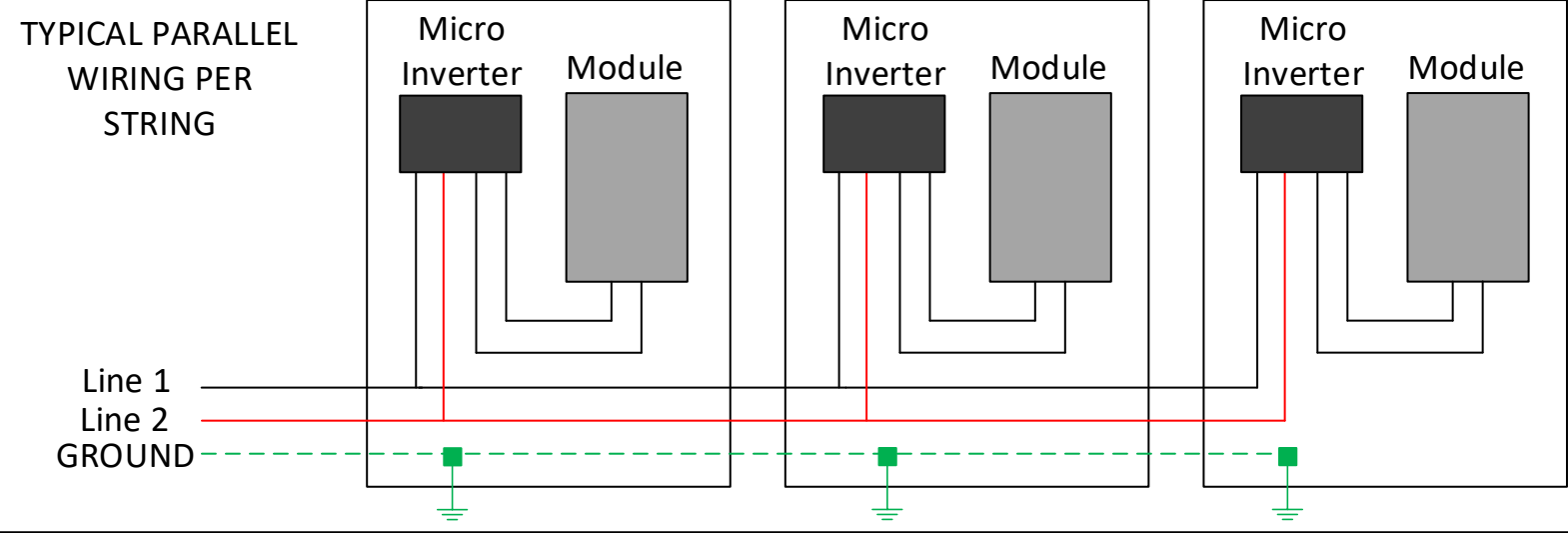
PV1

- System Size: 18,450W DC
- Battery Total Energy: 15.0 kWh
- (45) ENPHASE IQ8PLUS-72-2-US MICROINVERTERS
- Inverter Output: 1.21A max @ 240 VAC (each micro inverter)
- 290 VA AC output max (each micro inverter)
- 13.05 kVA AC output max

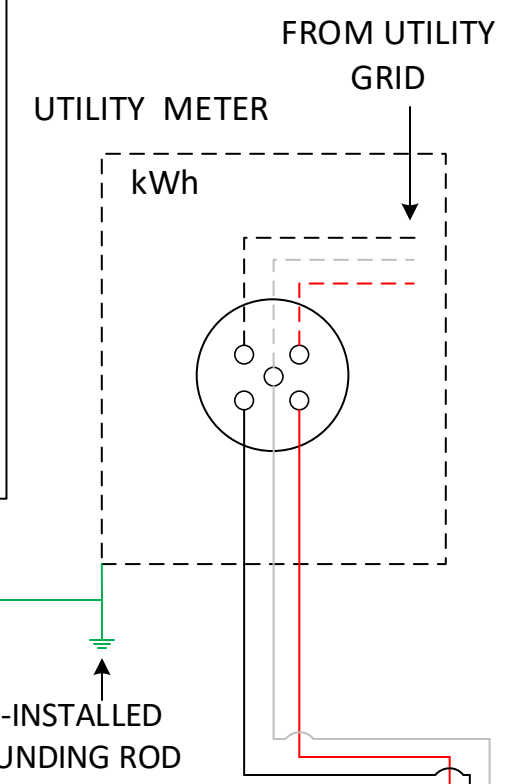
- Grounding will be done via Pegasus grounding lugs and mid-clamps to ensure the rail and panels are continuously grounded.
- Rapid Shutdown is included in the Micro Inverters, refer to Micro Inverter attached datasheets.
- The load center / disconnect will be visible, lockable accessible to utility linesmen and will be properly labelled as per NEC requirements. It will be located on the exterior wall of the building, next to the utility meter.

Sr.No	#Wire	Conduit Size	Ground Wire	Amperage
1	3 x #4 THHN Cu	1" LFNC	#6 Green Cu	80
2	3 x #3/0 THHN Cu	2" PVC		200
3	3 x #3/0 THHN Cu	2" PVC	#6 Green Cu	200
4	4 x #12 THHN Cu	3/4" LFNC	#10 Green Cu	16
5	3 x #6 THHN Cu	3/4" EMT	#8 Green Cu	60
6	3 x #6 THHN Cu	3/4" LFNC	#8 Green Cu	60
7	Enphase Control Cable (4 conductors)			
8	USB - A to USB - C wire	3/4" EMT		
9	Enphase Control Cable (4 conductors)	3/4" EMT		
10	Lead Wire 18AWG, PVC Extruded	3/4" LFNC		





Line 1		Note: 15A breaker for IQ Gateway from IQ Combiner 4 will be removed and envoy will be wired to the 20Amp Quad breaker on IQ System Controller 3.
Line 2		
Neutral		Note: Ground and neutral should be bound in the IQ Controller 3.
Ground		Note: Loads more than 48A will be non-backed up by Enphase IQ 5P Batteries and will be managed manually.
CT Wire		



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Detailed Electrical Diagram

JOB NUMBER:

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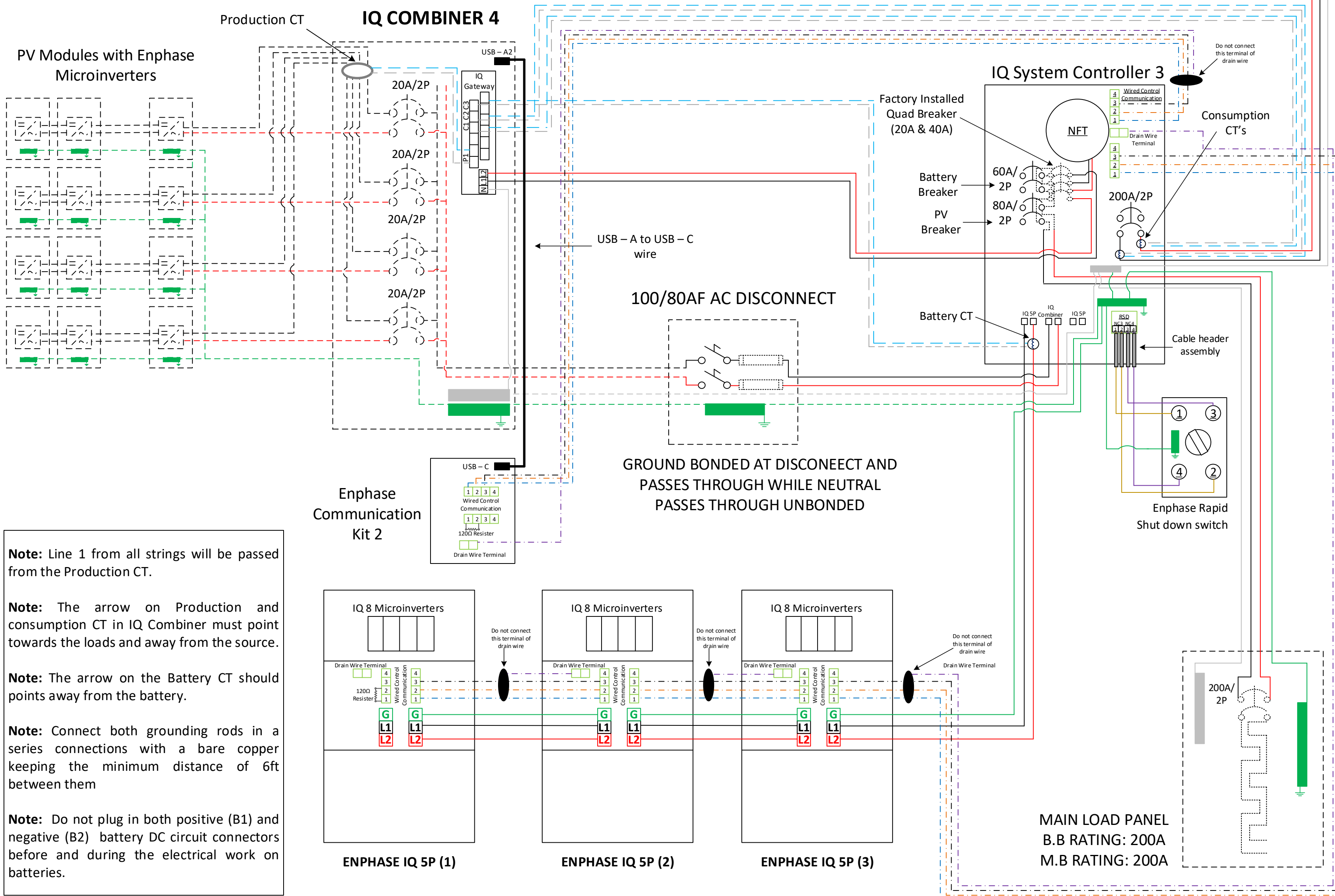
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PV2



Note: Line 1 from all strings will be passed from the Production CT.

Note: The arrow on Production and consumption CT in IQ Combiner must point towards the loads and away from the source.

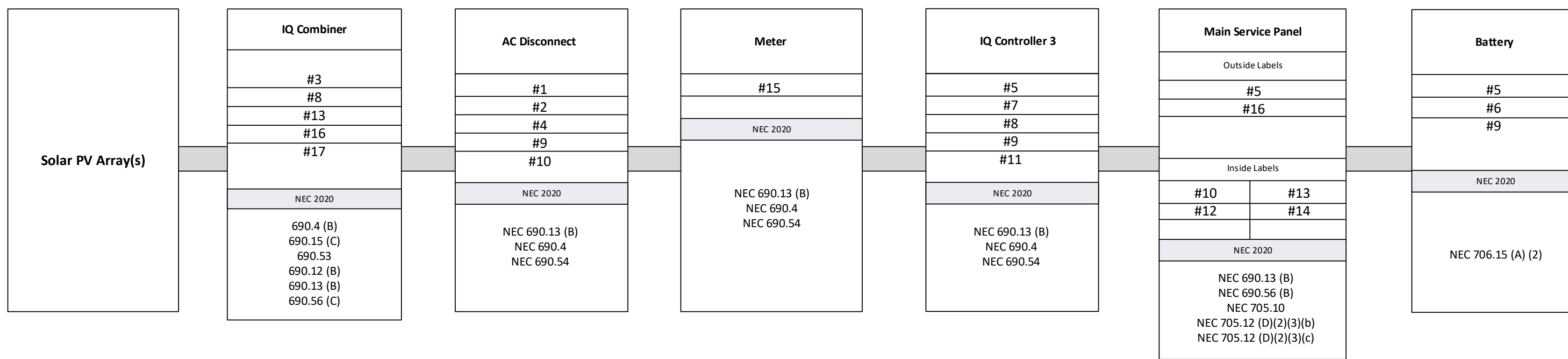
Note: The arrow on the Battery CT should point away from the battery.

Note: Connect both grounding rods in a series connections with a bare copper keeping the minimum distance of 6ft between them

Note: Do not plug in both positive (B1) and negative (B2) battery DC circuit connectors before and during the electrical work on batteries.



MAIN LOAD PANEL
B.B RATING: 200A
M.B RATING: 200A



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LABELING AND WARNING SIGNS: NEC 2020

A. PURPOSE

PROVIDE EMERGENCY RESPONDERS WITH APPROPRIATE WARNING AND GUIDANCE WITH RESPECT TO ISOLATING THE SOLAR ELECTRIC SYSTEM. THIS CAN FACILITATE IDENTIFYING ENERGIZED ELECTRICAL LINES THAT CONNECT THE SOLAR PANELS TO THE INVERTER, AS SHOULD NOT BE CUT WHEN VENTING FOR SMOKE REMOVAL.

B. MAIN SERVICE DISCONNECT:

1. RESIDENTIAL BUILDINGS- THE MARKING MAY BE PLACED WITHIN THE MAIN SERVICE DISCONNECT. THE MARKING SHALL BE PLACED ON THE OUTSIDE COVER IF THE MAIN SERVICE DISCONNECT IS OPERABLE WITH THE SERVICE PANEL CLOSED.

2. COMMERCIAL BUILDINGS- THE MARKINGS SHALL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECT CLEARLY VISIBLE FROM THE LOCATION WHERE THE LEVER IS OPERATED

3. MARKINGS, VERBIAGE, FORMAT AND TYPE OF MATERIAL

- a. VERBIAGE: CAUTION; SOLAR ELECTRIC SYSTEM CONNECTED
b. FORMAT:

- (1) WHITE LETTERING ON A RED BACKGROUND
(2) MINIMUM 3/8 INCH LETTER HEIGHT
(3) ALL LETTERS SHALL BE CAPITALIZED
(4) ARIAL OR SIMILAR FONT, NON-BOLD

c. MATERIAL:

- (1) REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (USE UL-969) AS STANDARD FOR WEATHER RATING); DURABLE ADHESIVE MATERIALS MEET THIS REQUIREMENT.

C. MARKING REQUIREMENTS ON CONDUIT, RACEWAYS, ENCLOSURES, CABLE ASSEMBLIES, COMBINERS AND JUNCTION BOXES;

1. MARKING: PLACEMENT, VERBIAGE, FORMAT AND TYPE OF MATERIAL.

- a. PLACEMENT: MARKINGS SHALL BE PLACED EVERY 10 (TEN) FEET ON ALL INTERIOR AND EXTERIOR DC CONDUITS, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLIES, AT TURNS ABOVE AND/OR BELOW PENETRATIONS, ALL COMBINERS AND JUNCTION BOXES.
b. VERBIAGE: CAUTION SOLAR CIRCUIT
c. THE FORMAT AND TYPE OF MATERIAL SHALL ADHERE TO SECTION B-3.B & C ABOVE

D. INVERTERS ARE NOT REQUIRED TO HAVE CAUTION MARKINGS

#1 PHOTOVOLTAIC
AC DISCONNECT

#2 RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

#3 PHOTOVOLTAIC POWER SOURCE
OPERATING AC VOLTAGE 240 V
MAXIMUM OPERATING AC OUTPUT CURRENT 54.45 A

#4 AC DISCONNECT PHOTOVOLTAIC SYSTEM POWER SOURCE
RATED AC OUTPUT CURRENT 54.45 AMPS
NOMINAL OPERATING AC VOLTAGE 240 VOLTS

#5 SOLAR AC DISCONNECT LOCATED AT SOUTH SIDE WALL OF THE HOUSE BESIDE THE UTILITY METER

#6 BATTERY

#7 MAIN BATTERY SYSTEM DISCONNECT

#8 WARNING
THREE POWER SOURCES
SOURCES: UTILITY GRID, BATTERY AND PV SOLAR ELECTRIC SYSTEM

#9 SERVICE DISCONNECT LOCATED IN THE IQ CONTROLLER 3

#10 BATTERY DISCONNECT LOCATED IN THE IQ CONTROLLER 3

#11 WARNING
SOLAR ELECTRIC CIRCUIT BREAKER IS BACKFEED

#12 WARNING
TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

#13 WARNING
ELECTRIC SHOCK HAZARD
TERMINAL ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

#14 WARNING
POWER SOURCE OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE

#15 WARNING
THIS SERVICE METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM

#16 SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY

#17 PHOTOVOLTAIC SYSTEM COMBINER PANEL DO NOT ADD LOADS

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PV Labels

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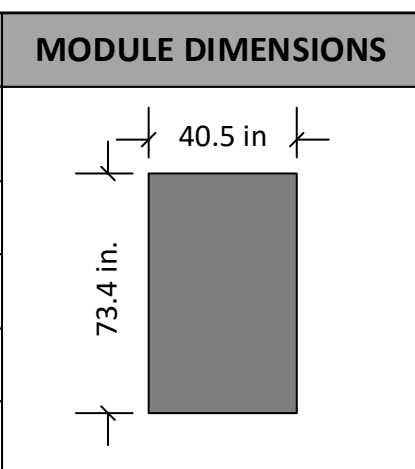
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PV3



ROOF DESCRIPTION			
ROOF	PITCH	AZIMUTH	NO. OF MODULES
A	22°	258°	45



Rails and Splices : PSR-B84 (BLACK)

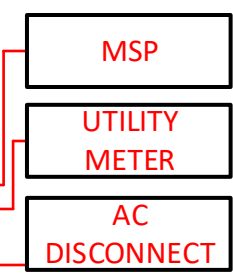
Rafter Spacing : 24 in

Attachment Span: 4ft

Roof Attachment : S5 SolarFoot

There is an exposed fastened 9" AG panel metal roof

The roof is located in 110mph wind zone



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Bill of Material

JOB NUMBER:

24-66-GR

Date:

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Revision:

A

Sheet Size:

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Sheet Number:

PV4

ELECTRICAL ITEMS

- 01 x COMMS-KIT-02: Enphase Communication Kit 2
- 01 x SC200D111C240US01: IQ System Controller 3
- 03 x IQBATTERY-5P-1P-NA: IQ Battery 5P
- 01 x CTRL-SC3-NA-01: Enphase Control Cable (70 ft.)

- 01 x X-IQ-NA-HD-125A: Hold down kit for Eaton circuit breaker with screws
- 01 x BRK-200A-2P-240V: Main Breaker, 2-Pole, 200Amps(Eaton CSR2200N)
- 01 x BRK-60A-2P-240V: Circuit Breaker, 2 pole, 60A (Eaton BR260)
- 01 x BRK-80A-2P-240V: Circuit Breaker, 2 pole, 80A (Eaton BR 280)

PV LABELS

Sr No	Code	Qty
01	03-302	01
02	02-316	02
03	03-390	01
04	03-306	01
05	8M-001	05
06	03-395	03
07	03-304	01
08	03-230	03
09	8M-002	05
10	8M-004	02
11	05-342	01
12	05-372	01
13	05-215	04
14	05-216	01
15	07-359	01
16	07-111	02
17	03-355	01
18	03-351	02

BILL OF MATERIAL
SCALE: 1/8" - 1'

